Climate Monitoring from Space – Architecture for Sustained Observations

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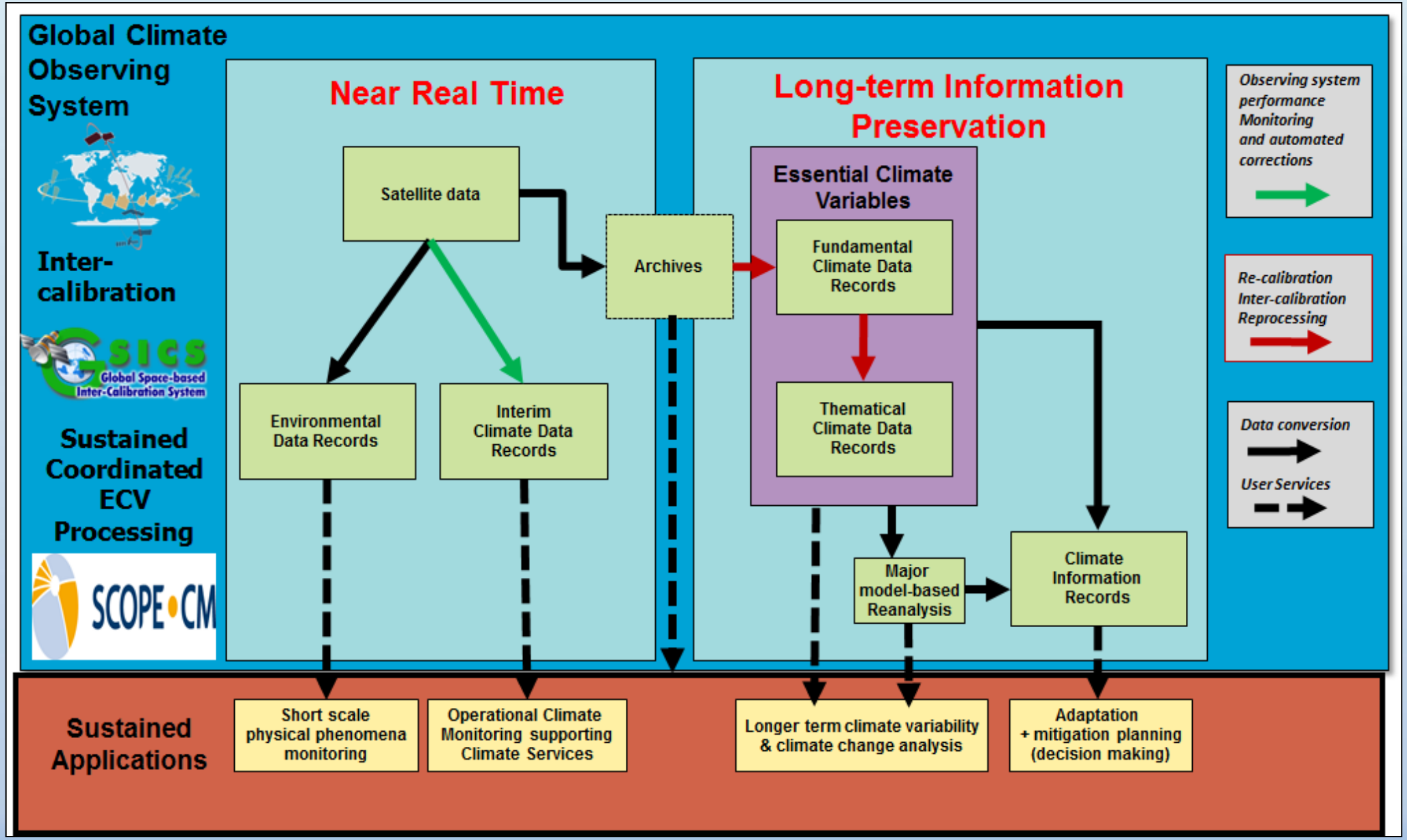
Outline

- Space Agencies establish a formal mechanism for coordination of climate missions and processing of those data for Essential Climate Variables (ECVs) – Working Group on Climate
- Elements of an international architecture for Climate Monitoring – A parallel to the World Weather Watch
- Progress on an ECV inventory and Metrics for CDRs
- Conclusions

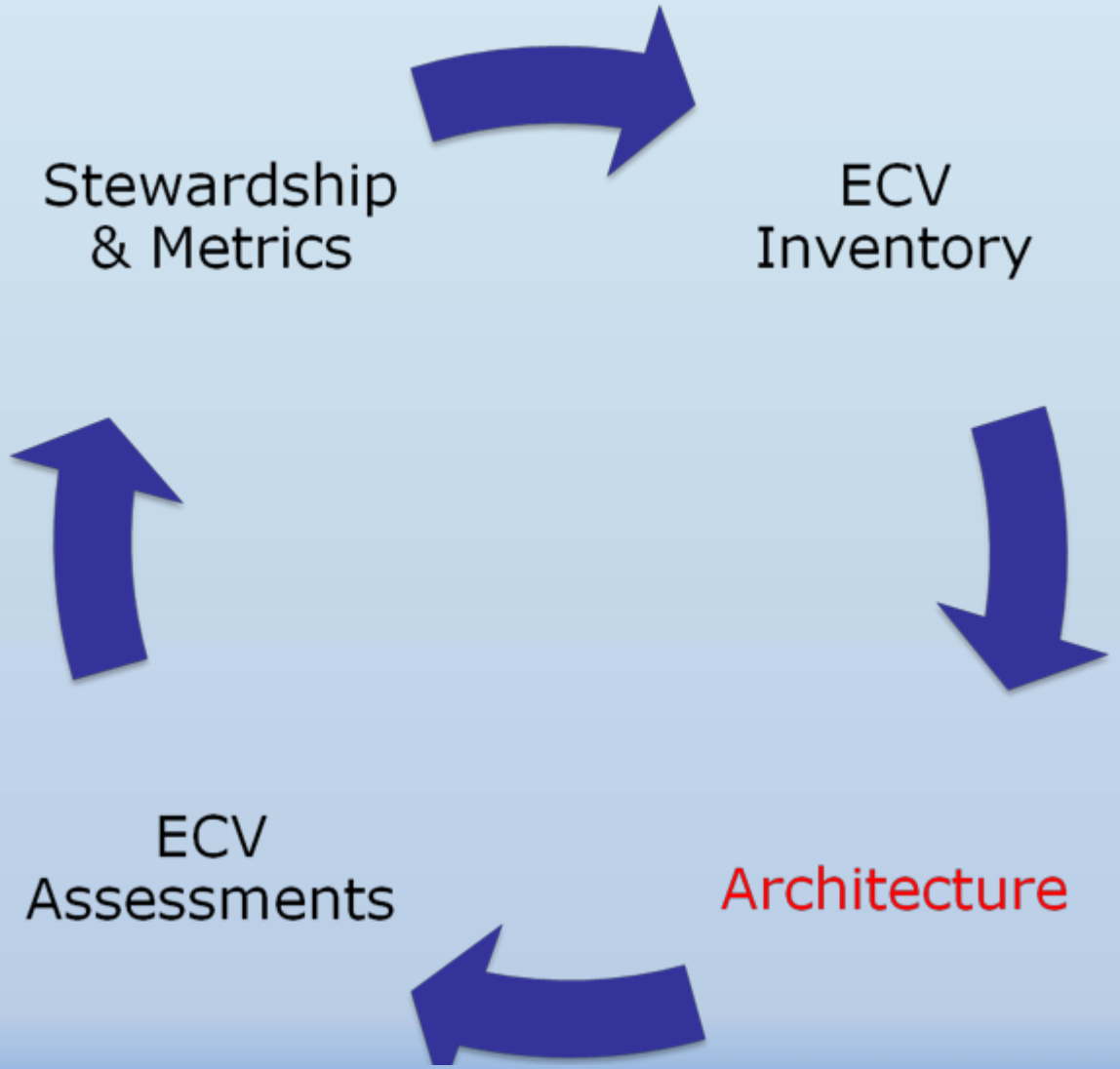
Need for a Climate Architecture -



CEOS-CGMS Working Group Climate

- Established in 2011 by the Committee on Earth Observation Satellites (CEOS) and joined with Coordination Group on Meteorological Satellites (CGMS) in 2013
  - Provision of a structured, comprehensive and accessible view as to what Climate Data Records (CDRs) are currently available,
  - Creation of the conditions for delivering further CDRs,
  - Optimization of the planning of future satellite missions and constellations to expand existing and planned CDRs, both in terms of coverage and record length, and to address possible gaps with respect to GCOS requirements.

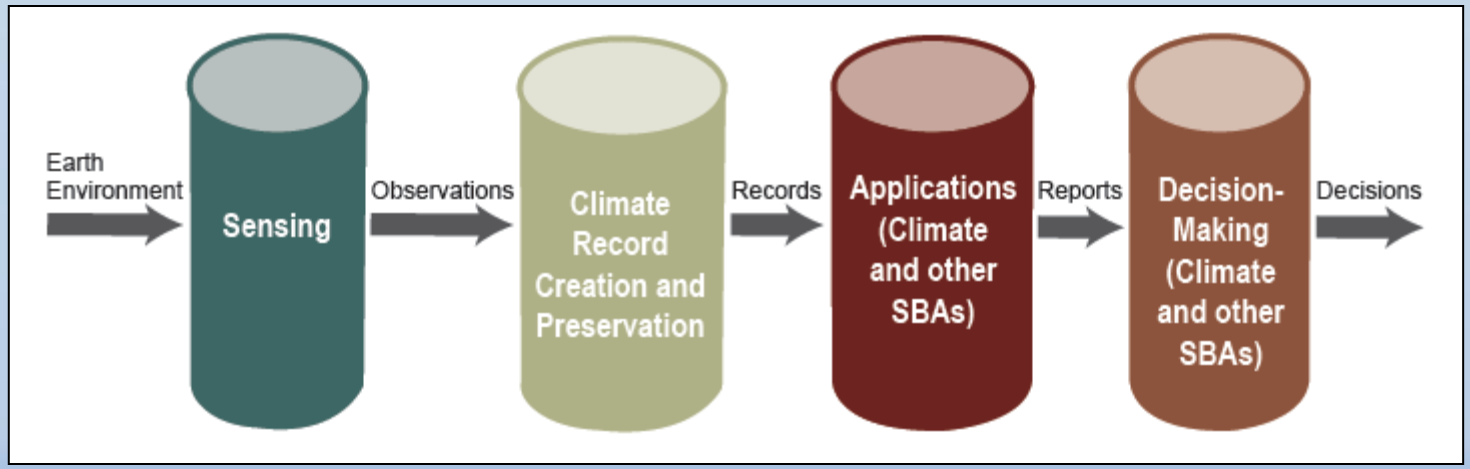
CEOS-CGMS Working Group Climate – Work Plan Elements



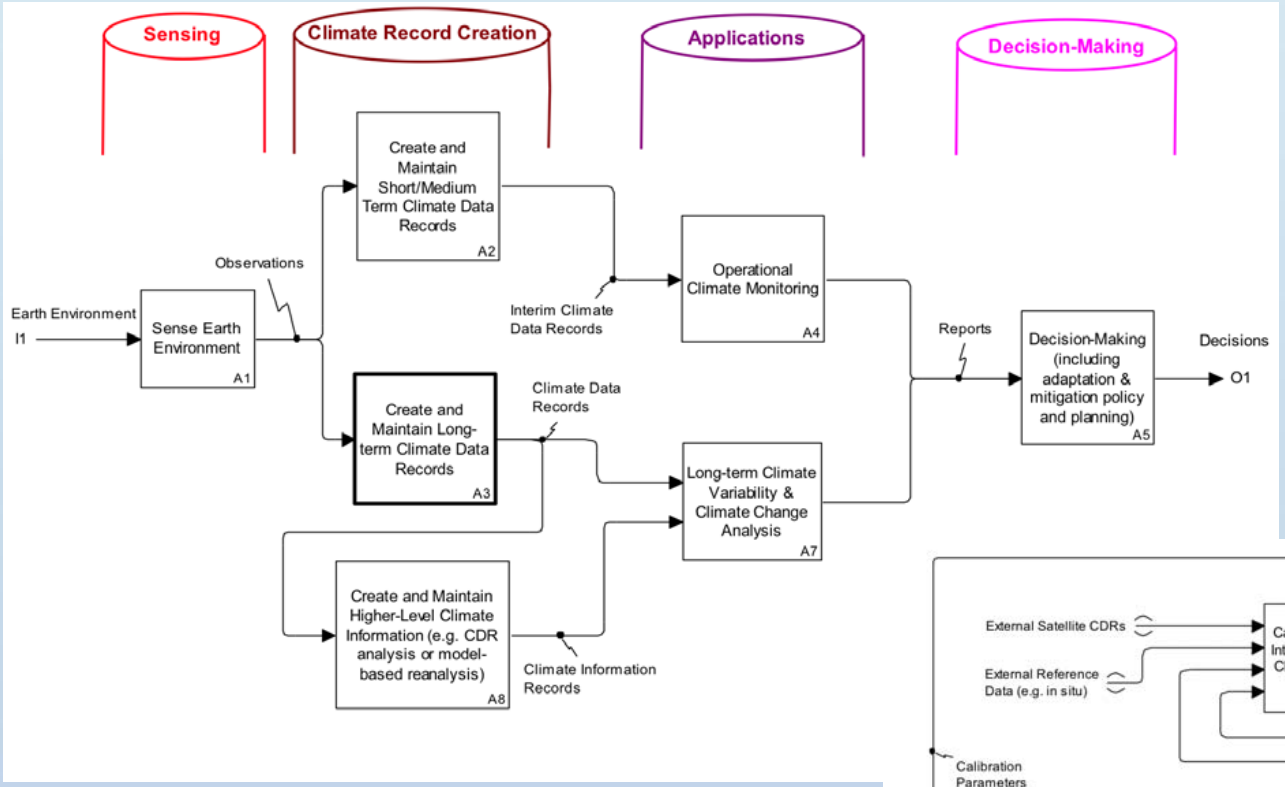
CEOS-CGMS Working Group Climate – Logical and Physical Architecture

- **logical view: represents the requirements baseline as a set of interlinked functions and associated data flows (i.e. the target) . Logical view is as stable as the requirements baseline and, once established, should require little maintenance**

- **physical view: describes how the logical view is implemented, i.e. how close we are to achieving the target. Needs to maintained on a regular basis to make sure it appropriately reflects the prevailing status (will take longer to determine)**

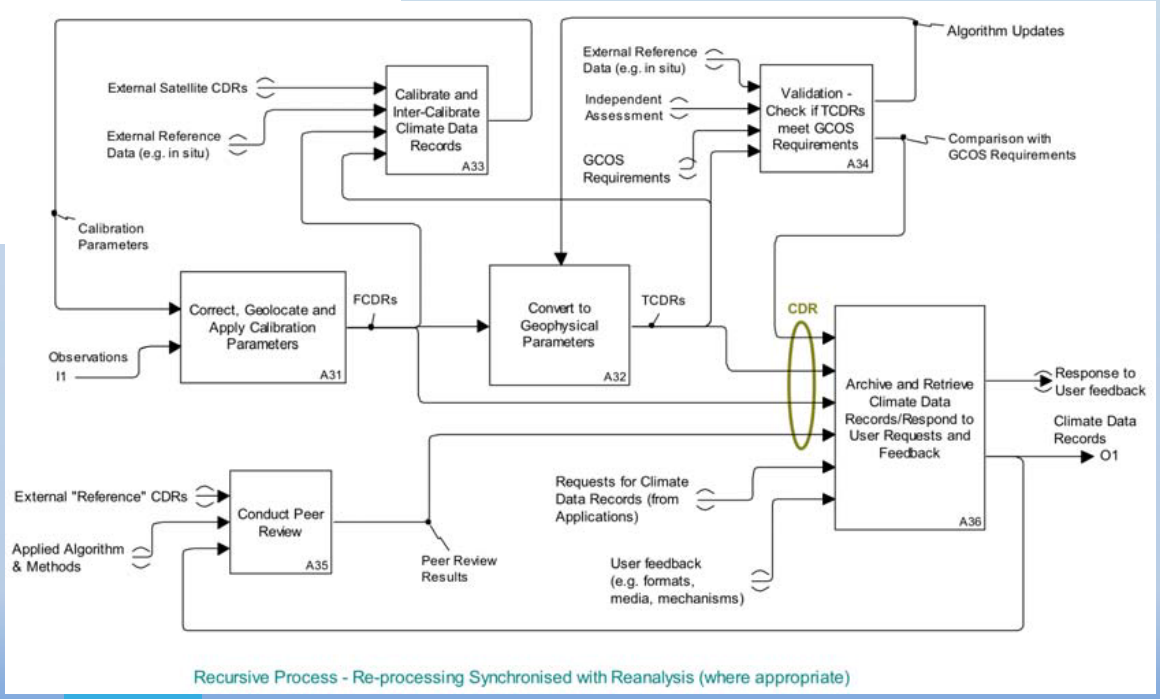


Climate Monitoring - Logical Architecture



Traceable to GCOS Guidelines and GCOS Climate Monitoring Principles

Traceable from ECV Inventory and physical representation of Climate Monitoring Architecture



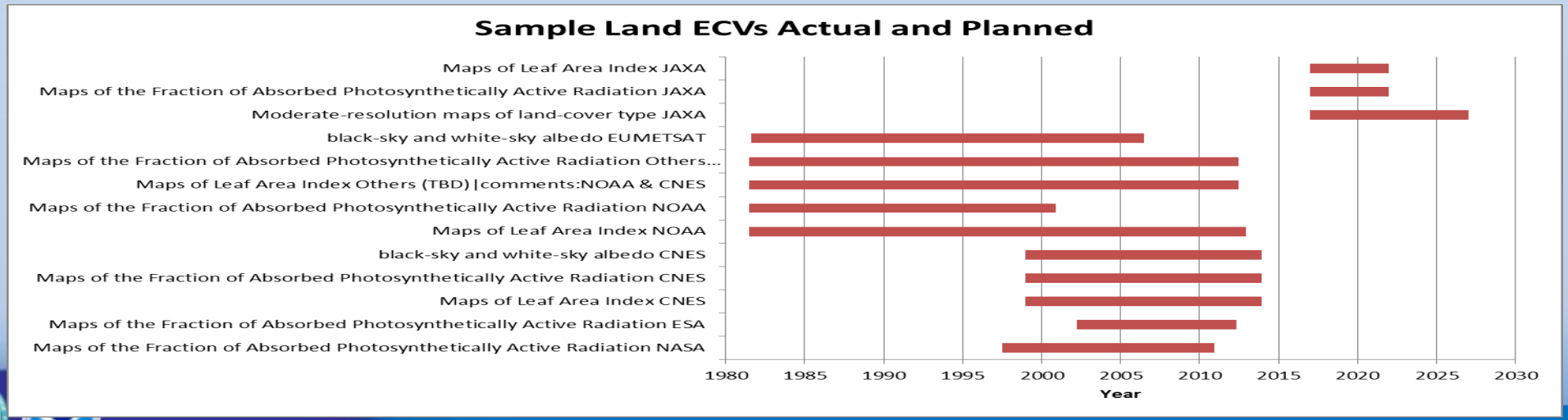
Climate Monitoring Architecture Report

- *Strategy Towards an Architecture for Climate Monitoring from Space* Report is complete and accepted by Space Agencies - http://www.ceos.org/images/strategy_towards_architecture_hig_rez_V10_high_rez.pdf

- Next steps will involve capturing several Space Agency physical architectures and ensuring coordination so that users can easily use or plug into the architecture at the point they need to

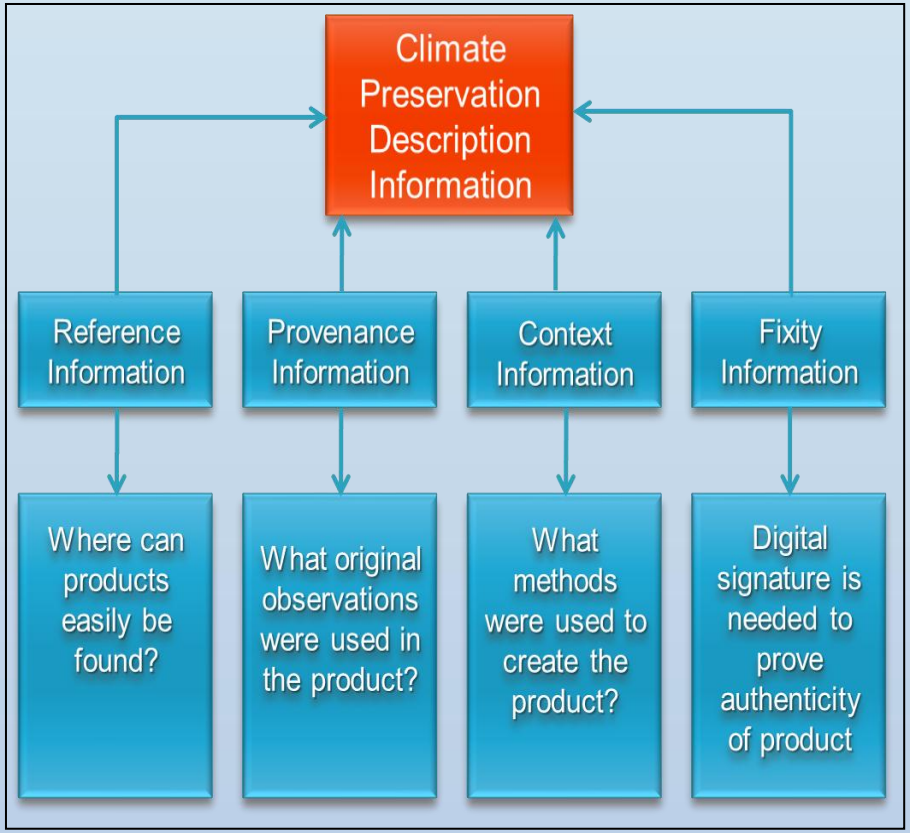
Progress on an ECV Inventory

- 213 Records entered by 11 different Space Agencies
- Describes the current and planned monitoring capability on an ECV basis (allow easier response to e.g. GCOS IP)
- Combined perspective of the logical and physical views should enable the definition of an optimum “macroscale” space system configuration and its components
- Used at the ECV/product level to identify gaps and shortfalls
- Formulation of a coordinated action plan to address such gaps and shortfalls…
- Trigger for the medium-term activities that need to be undertaken to sustain the long-term implementation of the architecture



Progress on CDR Metrics

- A Maturity Matrix for Assessing the Completeness of CDRs was proposed by Bates and Privette 2012
  DOI :10.1029/2012EO440006
- The Maturity Matrix assess Software Readiness, Metadata, Documentation, Product Validation, Public Access, and Utility on a Maturity on a scale of 1-6 in each area
- The Maturity Matrix attempts to ensure these attributes are available for a scientific assessment of a CDR
- Community feedback has been positive and recommended separating the Matrix assessment into two: one to review generation of data for climate (transparency, provenance, maturity of the system) and one for informing climate users (quantitative assessment and comparison, comparability, relevance to climate)



Conclusions

- International Space Agencies, through a joint Working Group on Climate, are making progress on establishing an architecture for Climate Monitoring from Space
- The intent of this architecture is to provide a basis for a sustained and coordinated system for climate observing, processing, and applications to support decision making
- An initial ECV inventory has been conducted that will allow access to all components of the architecture
- CDR Maturity Metrics have been proposed and vetted. Users emphasized the need to split the maturity assessment into two areas: one emphasizing process and the other emphasizing science

Thanks

- Questions?